Claims

1 548917 1.   A method of operating a computer aided design system in presumptive

2   mode, comprising the steps of:

3   floating a selected graphic object relative to a graphic pointing symbol;

4   determining when the selected graphic object is within a predetermined proximity

5   of an underlying graphic object;

6   manipulating the selected graphic object into a presumptive geometric

7   relationship with the underlying graphic object according to predetermined geometric

8   rules; and

9   maintaining the presumptive geometric relationship while the graphic pointing

10   symbol remains within the predetermined proximity of the underlying graphic object.

1   2.   The method of claim 1, wherein the predetermined proximity is a location

2   tolerance before said manipulating step and converts to a larger rejection tolerance during

3   said maintaining step.

1   3.   The method of claim 1, wherein said manipulating step comprises the step

2   of:

3   orientating the selected graphic object according to a tangential angle with respect

4   to the underlying graphic object at a cling point.

1   4.   The method of claim 1, wherein said manipulating step includes the step

2   of:

3   positioning the selected graphic object at a predetermined offset relative to the

4   underlying graphic object.

1   5.   The method of claim 4, wherein the underlying graphic object has two

2   sides, during said maintaining step, further comprising the step of:

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3   moving the selected graphic object to the opposite side of the underlying graphic

4   object when the graphic pointing symbol is moved to the opposite side.

1   6.   The method of claim 5, wherein said maintaining step further comprises

2   the step of:

3   mirroring the selected graphic object about the underlying graphic object when

4   moved to the opposite side of the underlying graphic object.

1   7.   The method of claim 6, wherein said maintaining step further comprises

2   the step of:

3   mirroring the selected graphic object about a perpendicular offset line when

4   moved to the opposite side of the underlying graphic object.

1   8.   The method of claim 5, wherein said maintaining step further comprises

2   the step of:

3   mirroring the selected graphic object about a perpendicular offset line when

4   moved to the opposite side of the underlying graphic object.

1   9.   The method of claim 1, after said manipulating step, further comprising

2   the step of :

3   modifying the underlying graphic object according to the predetermined

4   geometric rules.

1   10.   The method of claim 9, wherein said modifying step comprises the step of:

2   dividing the underlying graphic object into two separate underlying graphic

3   objects for inserting the selected graphic object therebetween.

1   11.   The method of claim 10, wherein said modifying step further comprises

2   the step of:

3   deleting a portion of the original underlying graphic object for inserting the
4   selected graphic object.

1   12.   The method of claim 1, wherein the selected graphic object includes at
2   least one alignment vector, said manipulating step further comprising the step of:
3   aligning the selected graphic object with the underlying graphic object according
4   to the alignment vector.

1   13.   The method of claim 1, wherein the selected graphic object and the
2   underlying graphic object each have an alignment vector, wherein said manipulating step
3   comprises the step of:
4   aligning the selected graphic object with the underlying graphic object by aligning
5   the alignment vectors.

1   14.   The method of claim 1, wherein the selected graphic object includes a clip
2   region, said manipulating step further comprising the step of:
3   partially deleting the underlying graphic object according to the clip region.

1   15.   The method of claim 14, wherein the underlying graphic object comprises
2   a plurality of graphic objects, said partially deleting step further comprising the step of:
3   partially deleting only selected ones of the plurality of graphic objects
4   corresponding to the clip region.

1   16.   The method of claim 1, wherein said maintaining step further comprises
2   the steps of:
3   clinging the selected graphic object to an initial cling point; and
4   rotating the selected graphic object about the initial cling point corresponding to
5   movement of the graphic pointing symbol.

17. The method of claim 1, further comprising the step of:

unclinging the selected graphic object from the underlying graphic object to float with the graphic pointing symbol when the graphic pointing symbol is moved a greater distance than the predetermined proximity from the underlying graphic object.

18. The method of claim 1, wherein said maintaining step includes the step of:

moving the selected graphic object relative to a sliding cling point along the underlying graphic object where the cling point moves relative to the graphic pointing symbol as the graphic pointing symbol is moved within the predetermined proximity of the underlying graphic object.

19. The method of claim 18, wherein said maintaining step further comprises the step of:

interactively modifying the underlying graphic object according to the predetermined rules and relative to the sliding cling point as the graphic pointing symbol is moved.

20. The method of claim 18, wherein the underlying graphic object includes a primary vector and a secondary vector, the selected graphic object having a first alignment vector and a second alignment vector, wherein said manipulating and maintaining steps further comprise the steps of:

aligning the selected graphic object with the primary vector according to the first alignment vector when the first alignment vector is within a predetermined proximity of the primary vector; and

aligning the selected graphic object with the secondary vector according to the second alignment vector when the second alignment vector is within a predetermined proximity of the secondary vector.

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1 SUB q3 → 21. A method of operating a computer aided design system, comprising the
2 steps of:
3   providing at least one graphic object to be selected for insertion into a graphic
4 design;
5   displaying and floating a selected graphic object with a graphic cursor moved within
6 the graphic design; and
7   when the selected graphic object is within a predetermined proximity with respect to
8 one or more underlying graphic objects, automatically manipulating the object into a
9 presumptive geometric relationship with the underlying graphic object.

1   22. The method of claim 21, wherein said manipulating step comprises the steps
2 of:
3   orienting the selected graphic object relative to a cling point along the underlying
4 graphic object; and
5   positioning the selected graphic object at a predetermined offset relative to the cling
6 point.

1   23. The method of claim 22, further comprising the step of:
2 continually re-orienting and re-positioning the selected graphic object relative to a
3 sliding cling point which moves relative to the graphic cursor as it is moved within the
4 predetermined proximity.

1 SUB q4 → 24. A presumptive mode computer aided design system for interactively
2 manipulating and displaying a selected object according to predefined geometric
3 relationships, comprising:
4   a display device for displaying a graphic environment;
5   memory for storing data, including:
6   a data base defining geometric relationships among graphic objects;

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7   a plurality of graphic object files, each defining a corresponding graphic object and associated symbol for display in said graphic environment; and

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9   a design file for incorporating a plurality of underlying graphic objects according to said geometric relationships;

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11   a pointing device for receiving input from an operator; and

12   a processor coupled to said memory, said display device and said pointing device for controlling said graphic environment;

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14   wherein the operator selects an object for insertion into said design file and manipulates a graphic cursor in proximity with one of said underlying graphic objects displayed in said geographic environment, wherein said processor floats said selected object with said graphic cursor and then manipulates said graphic object and said design file in to a presumptive geometric relationship when said selected object is within proximity with said one of said underlying graphic objects.

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